

Analytical Results
for
Phifer Wire Products

Clayton Project No. 46431-17

Sample Matrix/Media:	Screens	Date Received:	02/08/93
Lab Number:	126825 >C9232	Date Analyzed:	02/16/93
Sample Identification:	PH-G-3 (1989)	Temperature:	30
Analytical Method:	EPA T01 (Modified)		

<u>Volatile Compounds</u>	Concentration* (ug)	Limit of Detection (ug)
Acetone	0.2	0.1
** Benzene	0.15	0.01
** Bromodichloromethane	<0.01	0.01
** Bromoform	<0.01	0.01
** 2-Butanone	<0.1	0.1
Carbon disulfide	0.01	0.01
** Carbon tetrachloride	<0.01	0.01
** Chlorobenzene	0.01	0.01
Chloroform	<0.01	0.01
** Dibromochloromethane	<0.01	0.01
1,1-Dichloroethane	<0.01	0.01
1,2-Dichloroethane	<0.01	0.01
1,1-Dichloroethene	<0.01	0.01
1,2-Dichloroethene (total)	<0.01	0.01
** 1,2-Dichloropropane	<0.01	0.01
** cis-1,3-Dichloropropene	<0.01	0.01
** trans-1,3-Dichloropropene	<0.01	0.01
** Ethylbenzene	<0.01	0.01
** 2-Hexanone	<0.05	0.05
Methylene chloride	<0.05	0.05
** 4-Methyl-2-pentanone	<0.05	0.05
** Styrene	0.03	0.01
** 1,1,2,2-Tetrachloroethane	<0.01	0.01
** Tetrachloroethene	<0.01	0.01
** Toluene	0.01	0.01
** 1,1,1-Trichloroethane	<0.01	0.01
** 1,1,2-Trichloroethane	<0.01	0.01
** Trichloroethene	<0.01	0.01
** Vinyl acetate	<0.05	0.05
** Xylenes (total)	0.02	0.01

* Results are blank corrected.
 ** Concentrations are estimated due to low Internal Standards recovery.

Analytical Results
for
Phifer Wire Products

Clayton Project No. 46431-17

Sample Matrix/Media:	Screens	Date Received:	02/08/93
Lab Number:	126825 >C9227	Date Analyzed:	02/16/93
Sample Identification:	PH-G-3 (1989)	Temperature:	50
Analytical Method:	EPA T01 (Modified)		

<u>Volatile Compounds</u>	Concentration* (ug)	Limit of Detection (ug)
Acetone	0.2	0.1
Benzene	0.06	0.01
Bromodichloromethane	<0.01	0.01
Bromoform	<0.01	0.01
2-Butanone	<0.1	0.1
Carbon disulfide	<0.01	0.01
Carbon tetrachloride	<0.01	0.01
** Chlorobenzene	0.01	0.01
Chloroform	<0.01	0.01
Dibromochloromethane	<0.01	0.01
1,1-Dichloroethane	<0.01	0.01
1,2-Dichloroethane	<0.01	0.01
1,1-Dichloroethene	<0.01	0.01
1,2-Dichloroethene (total)	<0.01	0.01
1,2-Dichloropropane	<0.01	0.01
cis-1,3-Dichloropropene	<0.01	0.01
trans-1,3-Dichloropropene	<0.01	0.01
** Ethylbenzene	<0.01	0.01
** 2-Hexanone	<0.05	0.05
Methylene chloride	<0.05	0.05
** 4-Methyl-2-pentanone	<0.05	0.05
** Styrene	0.02	0.01
** 1,1,2,2-Tetrachloroethane	<0.01	0.01
** Tetrachloroethene	<0.01	0.01
** Toluene	<0.01	0.01
1,1,1-Trichloroethane	0.02	0.01
1,1,2-Trichloroethane	<0.01	0.01
Trichloroethene	<0.01	0.01
Vinyl acetate	<0.05	0.05
** Xylenes (total)	<0.01	0.01

* Results are blank corrected.
 ** Concentrations are estimated due to low Internal Standard recovery.

Analytical Results
for
Phifer Wire Products

Clayton Project No. 46431-17

Sample Matrix/Media: Screens Date Received: 02/08/93
Lab Number: 126825 >C9381 Date Analyzed: 03/05/93
Sample Identification: PH-G-3 (1989) Temperature: 100
Analytical Method: EPA T01 (Modified)

<u>Volatile Compounds</u>	<u>Concentration*</u> <u>(ug)</u>	<u>Limit of</u> <u>Detection</u> <u>(ug)</u>
Acetone	0.1	0.1
Benzene	0.02	0.01
Bromodichloromethane	<0.01	0.01
Bromoform	<0.01	0.01
2-Butanone	<0.1	0.1
Carbon disulfide	<0.01	0.01
Carbon tetrachloride	<0.01	0.01
Chlorobenzene	<0.01	0.01
Chloroform	<0.01	0.01
Dibromochloromethane	<0.01	0.01
1,1-Dichloroethane	<0.01	0.01
1,2-Dichloroethane	<0.01	0.01
1,1-Dichloroethene	<0.01	0.01
1,2-Dichloroethene (total)	<0.01	0.01
1,2-Dichloropropane	<0.01	0.01
cis-1,3-Dichloropropene	<0.01	0.01
trans-1,3-Dichloropropene	<0.01	0.01
Ethylbenzene	<0.01	0.01
2-Hexanone	<0.05	0.05
Methylene chloride	<0.05	0.05
4-Methyl-2-pentanone	<0.05	0.05
Styrene	<0.01	0.01
1,1,2,2-Tetrachloroethane	<0.01	0.01
Tetrachloroethene	<0.01	0.01
Toluene	0.05	0.01
1,1,1-Trichloroethane	0.02	0.01
1,1,2-Trichloroethane	<0.01	0.01
Trichloroethene	<0.01	0.01
Vinyl acetate	<0.05	0.05
Xylenes (total)	0.03	0.01

* Results are blank corrected.

Analytical Results
for
Phifer Wire Products

Clayton Project No. 46431-17

Sample Matrix/Media:	Screens	Date Received:	02/08/93
Lab Number:	126826 >C9233	Date Analyzed:	02/16/93
Sample Identification:	PH-K-4	Temperature:	30
Analytical Method:	EPA T01 (Modified)		

<u>Volatile Compounds</u>	Concentration* (ug)	Limit of Detection (ug)
Acetone	0.6	0.1
** Benzene	0.74	0.01
** Bromodichloromethane	<0.01	0.01
** Bromoform	<0.01	0.01
** 2-Butanone	0.3	0.1
Carbon disulfide	<0.01	0.01
** Carbon tetrachloride	<0.01	0.01
** Chlorobenzene	0.04	0.01
Chloroform	<0.01	0.01
** Dibromochloromethane	<0.01	0.01
1,1-Dichloroethane	<0.01	0.01
1,2-Dichloroethane	<0.01	0.01
1,1-Dichloroethene	<0.01	0.01
1,2-Dichloroethene (total)	<0.01	0.01
** 1,2-Dichloropropane	<0.01	0.01
** cis-1,3-Dichloropropene	<0.01	0.01
** trans-1,3-Dichloropropene	<0.01	0.01
** Ethylbenzene	0.03	0.01
** 2-Hexanone	0.58	0.05
Methylene chloride	<0.05	0.05
** 4-Methyl-2-pentanone	<0.05	0.05
** Styrene	0.08	0.01
** 1,1,2,2-Tetrachloroethane	0.26	0.01
** Tetrachloroethene	<0.01	0.01
** Toluene	0.04	0.01
** 1,1,1-Trichloroethane	<0.01	0.01
** 1,1,2-Trichloroethane	<0.01	0.01
** Trichloroethene	<0.01	0.01
** Vinyl acetate	<0.05	0.05
** Xylenes (total)	0.05	0.01

* Results are blank corrected.
 ** Concentrations are estimated due to low Internal Standards recovery.

Analytical Results
for
Phifer Wire Products

Clayton Project No. 46431-17

Sample Matrix/Media:	Screens	Date Received:	02/08/93
Lab Number:	126826 >C9228	Date Analyzed:	02/16/93
Sample Identification:	PH-K-4	Temperature:	50
Analytical Method:	EPA T01 (Modified)		

<u>Volatile Compounds</u>	Concentration* (ug)	Limit of Detection (ug)
Acetone	0.5	0.1
Benzene	0.22	0.01
Bromodichloromethane	<0.01	0.01
Bromoform	<0.01	0.01
2-Butanone	0.2	0.1
Carbon disulfide	<0.01	0.01
Carbon tetrachloride	<0.01	0.01
** Chlorobenzene	0.03	0.01
Chloroform	<0.01	0.01
Dibromochloromethane	<0.01	0.01
1,1-Dichloroethane	<0.01	0.01
1,2-Dichloroethane	<0.01	0.01
1,1-Dichloroethene	<0.01	0.01
1,2-Dichloroethene (total)	<0.01	0.01
1,2-Dichloropropane	<0.01	0.01
cis-1,3-Dichloropropene	<0.01	0.01
trans-1,3-Dichloropropene	<0.01	0.01
** Ethylbenzene	0.01	0.01
** 2-Hexanone	0.18	0.05
Methylene chloride	<0.05	0.05
** 4-Methyl-2-pentanone	0.05	0.05
** Styrene	0.04	0.01
** 1,1,2,2-Tetrachloroethane	<0.01	0.01
** Tetrachloroethene	<0.01	0.01
** Toluene	0.03	0.01
1,1,1-Trichloroethane	0.05	0.01
1,1,2-Trichloroethane	<0.01	0.01
Trichloroethene	<0.01	0.01
Vinyl acetate	<0.05	0.05
** Xylenes (total)	0.03	0.01

* Results are blank corrected.
** Concentrations are estimated due to low Internal Standard recovery.

Analytical Results
for
Phifer Wire Products

Clayton Project No. 46431-17

Sample Matrix/Media: Screens Date Received: 02/08/93
Lab Number: 126826 >C9384 Date Analyzed: 03/05/93
Sample Identification: PH-K-4 Temperature: 100
Analytical Method: EPA T01 (Modified)

<u>Volatile Compounds</u>	<u>Concentration*</u> <u>(ug)</u>	<u>Limit of</u> <u>Detection</u> <u>(ug)</u>
Acetone	0.2	0.1
Benzene	0.06	0.01
Bromodichloromethane	<0.01	0.01
Bromoform	<0.01	0.01
2-Butanone	<0.1	0.1
Carbon disulfide	0.26	0.01
Carbon tetrachloride	<0.01	0.01
Chlorobenzene	<0.01	0.01
Chloroform	<0.01	0.01
Dibromochloromethane	<0.01	0.01
1,1-Dichloroethane	<0.01	0.01
1,2-Dichloroethane	<0.01	0.01
1,1-Dichloroethene	<0.01	0.01
1,2-Dichloroethene (total)	<0.01	0.01
1,2-Dichloropropane	<0.01	0.01
cis-1,3-Dichloropropene	<0.01	0.01
trans-1,3-Dichloropropene	<0.01	0.01
Ethylbenzene	<0.01	0.01
2-Hexanone	<0.05	0.05
Methylene chloride	<0.05	0.05
4-Methyl-2-pentanone	<0.05	0.05
Styrene	<0.01	0.01
1,1,2,2-Tetrachloroethane	<0.01	0.01
Tetrachloroethene	<0.01	0.01
Toluene	0.02	0.01
1,1,1-Trichloroethane	<0.01	0.01
1,1,2-Trichloroethane	<0.01	0.01
Trichloroethene	<0.01	0.01
Vinyl acetate	<0.05	0.05
Xylenes (total)	0.02	0.01

* Results are blank corrected.

Midwestern Operations

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Clayton
ENVIRONMENTAL
CONSULTANTS

May 25, 1993

Mr. Charles E. Morgan
Executive Vice President and Corporate Counsel
PHIFER WIRE PRODUCTS, INC.
P.O. Box 1700
Tuscaloosa, Alabama 35403-1700

Clayton Project No. 46431.00

Dear Mr. Morgan:

Clayton Environmental Consultants, Inc. is pleased to provide you with three copies of our report on the dynamic environmental chamber evaluation performed on samples of screen material manufactured by Phifer Wire Products, Inc.

It has been a pleasure to provide our services to Phifer Wire Products, Inc. If you have any questions regarding this report, please contact Mr. Ronald C. Poore, IHIT, or me.

Sincerely,


Stephen D. Paul, CIH
Manager, Industrial Hygiene Services
Midwestern Operations

SDP/shc
Enclosures

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Clayton
ENVIRONMENTAL
CONSULTANTS

Dynamic Environmental Chamber Laboratory Study
for
Phifer Wire Products, Inc.
Tuscaloosa, Alabama

Clayton Project No. 46431.00

May 25, 1993

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Appendix

RESULTS OF DYNAMIC CHAMBER ANALYSIS

1.0 INTRODUCTION

Mr. Charles E. Morgan, Executive Vice President and Corporate Counsel at Phifer Wire Products, Inc., authorized Clayton Environmental Consultants, Inc. to perform a laboratory study to characterize the potential offgassing of air contaminants from window screen products manufactured by Phifer Wire Products, Inc. According to information provided to Clayton by Phifer Wire Products, Inc., three households in southeastern Michigan have submitted a variety of complaints regarding symptoms the homeowners believe are associated with the presence of the window screening in their homes (e.g., foul odors, coughing, allergies, burning eyes, and upper respiratory infections). This report provides the results of Clayton's laboratory study.

Mr. Ronald C. Poore, Industrial Hygienist at Clayton, performed a field evaluation for indoor air quality in each of the three homes on January 18, 1993; at that time, he collected bulk samples of screen material from each home. The findings of Clayton's indoor air quality evaluation for these three homes are provided in the report addressed to Mr. Morgan and dated April 7, 1993 (Clayton Project No. 45870.00). The addresses of the three homes evaluated are listed below:

6710 Sun Valley Drive
Clarkston, Michigan

5237 Sun Valley Court
Clarkston, Michigan

6859 Tanglewood Street
Waterford, Michigan

The purpose of Clayton's current laboratory study was to establish emission rates of volatile organic compounds (VOCs) from weathered and non-weathered samples of the screen material. The dynamic chamber analysis chosen provides a realistic simulation of emission rates of VOCs from materials in place in the home. The scope of Clayton's services provided for this study was outlined in Clayton's proposal, dated January 27, 1993, and addressed to Mr. Morgan. An explanation of the terms and conditions under which this work was performed was incorporated into the proposal.

Tabulated analytical results of the laboratory investigation are provided in the Appendix.

2.0 METHODS AND MATERIALS

Clayton contracted a qualified laboratory to perform a dynamic laboratory analysis of gases emitted from weathered and non-weathered screen samples obtained during these assessments.

Bulk samples of weathered screen material were obtained from each of the three homes. One of these samples was randomly selected for the laboratory study. This sample of weathered screen material had been in place in one home since approximately November 1988. According to the homeowner, the family's symptoms (coughing, increased respiratory infections, burning eyes, burning nose, and throat irritation) began in May 1989. The screens were replaced in 1992, but their symptoms remained. The weathered screen material had been placed in plastic bags in dark storage since it had been removed. The screen material had been installed on the interior of the windows and was exposed to full sun. Weathering from the wind occurred only when the windows were opened to allow airflow from outside.

One sample of the non-weathered screen material was sent to Clayton by Phifer Wire Products, Inc., in November of 1992. This sample was manufactured in September of 1992. This sample was not exposed to wind or sun. At Clayton, the sample was stored in a sealed polyethylene bag and was not exposed to direct sunlight.

Screen samples were placed in a polished stainless steel chamber at 50% relative humidity, 23° C (73.4° F) and 1 air-change per hour (the air was purified using a filtering system). The samples were allowed to equilibrate for 4 hours under these conditions. The VOCs liberated are then carried to a gas chromatograph/mass spectrophotometer (GC/MS) for analytical identification. Specific VOCs were identified using a library search routine, based on the GC retention time and mass spectral characteristics.

3.0 DISCUSSION

Analytical results indicate that the weathered screen material, obtained from one home and the non-weathered screen material, obtained from Phifer Wire Products, Inc., offgas detectable amounts of alcohols, aldehydes, aliphatic hydrocarbons, aromatic hydrocarbons, and esters at 23°C and 50% relative humidity.

Results of analysis of the weathered screen material using the environmental chamber GC/MS technique are provided below.

Analyte	Total Emissions ($\mu\text{g}/\text{m}^2 \cdot \text{hr}$)*
Alcohols	25.9
Aldehydes (benzaldehyde)	1.4
Aliphatic hydrocarbons	40.6
Aromatic hydrocarbons	17.9
Unidentified compounds	3.7
Total VOC emissions	89.23

* $\mu\text{g}/\text{m}^2 \cdot \text{hr}$ means micrograms per square meter per hour

Results of analysis of the new screen material using the environmental chamber GC/MS technique are provided below.

Analyte	Total Emissions ($\mu\text{g}/\text{m}^2/\text{hr}$)*
Alcohols (2-butoxy ethanol)	1.7
Aldehydes (benzaldehyde)	2.5
Aliphatic hydrocarbons	112.6
Aromatic hydrocarbons (xylenes)	3.1
Esters (acetic acid, phenylmethyl ester)	3.1
Unidentified compounds	23.5
Total VOC emissions	162.2

* $\mu\text{g}/\text{m}^2 \cdot \text{hr}$ means micrograms per square meter per hour

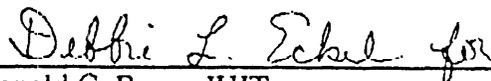
Results of analysis of the weathered and non-weathered samples indicate that, although the weathered screen material offgases these weathered compounds at detectable levels, the concentration of total VOCs is approximately half the concentration emitted by the new non-weathered screen material. These results are consistent with research findings that indicate that emission rates decrease over time for many materials.

In comparing levels for specific classes of compounds, the non-weathered screen material primarily offgases aliphatic hydrocarbons ($112.6 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), followed by unidentified compounds ($23.5 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), aromatic hydrocarbons [xylenes, ortho- and para-isomers] ($3.8 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), esters [acetic acid, phenyl methyl ester] ($3.1 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), aldehydes [benzaldehyde] ($2.5 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), and alcohols [2-butoxyethanol] ($1.7 \mu\text{g}/\text{m}^2 \cdot \text{hr}$).

The largest class of compounds detected in emissions from the weathered screen material is also aliphatic hydrocarbons ($40.6 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), followed by alcohols ($25.9 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), aromatic hydrocarbons ($17.9 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), unidentified compounds ($3.7 \mu\text{g}/\text{m}^2 \cdot \text{hr}$), and aldehydes [benzaldehyde] ($1.4 \mu\text{g}/\text{m}^2 \cdot \text{hr}$). Esters were not detected in emissions from the weathered screen material.

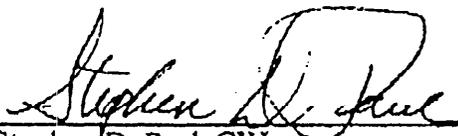
The data indicate that the screens can be a source of VOCs. The emission of VOCs appears to decrease over time with the total emission rate of VOCs from the weathered screen being approximately half that of the new screen material. The data do not indicate that the screen material is the only source or the major contributor of VOCs in the homes. Other materials, such as cleaning agents, dry cleaning agents, and carpet adhesives in homes are also likely sources of VOCs.

This report submitted by:



Ronald C. Poore, IHIT
Industrial Hygienist

This report reviewed by:



Stephen D. Paul, CIH
Manager, Industrial Hygiene Services
Midwestern Operations

May 25, 1993

APPENDIX
RESULTS
OF
DYNAMIC CHAMBER ANALYSIS



AIR QUALITY SCIENCES, INC.

ENVIRONMENTAL CHAMBER TEST REPORT

ELAPSED EXPOSURE HOUR	TVOC EMISSION FACTOR $\mu\text{g}/\text{m}^3\cdot\text{hr}$
4.000	162.20

Customer: Clayton Environmental

Sample Identification: AQS01453-001AA

Product Description: Screen; PH-11; New

Environmental Chamber: SA3

Product Loading: $1.00 \text{ m}^2/\text{m}^3$

Test Conditions: 1.0 ACH
50.0% RH \pm 2.0% RH
23.0°C \pm 1.0°C

Test Period: 04/13/93 - 04/13/93

Standard Test Methodology for Determining Volatile Organic Compound Emission Factors from Consumer Materials under Defined Test Conditions Using Small Environmental Chambers.

**IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS
AT 4 ELAPSED EXPOSURE HOURS
 $\mu\text{g}/\text{m}^3\cdot\text{hr}$**

PRODUCT 01453-001AA, SCREEN, PH-11, NEW

CATEGORY	COMPOUND IDENTIFIED	EMISSION FACTOR $\mu\text{g}/\text{m}^3\cdot\text{hr}$
Acids	None detected	
Alcohols and Associated Compounds	Ethanol, 2-butoxy	1.7
Aldehydes	Benzaldehyde	2.5
Aliphatics	2-Undecene, 5-methyl-*	24.4
	Undecane, 4-methyl*	11.1
	Decane, 3-methyl	10.8
	1,6-Octadiene, 2,5-dimethyl-, (E)-*	8.8
	Decane, 2,5,9-trimethyl- (9CI)*	8.0
	Tridecane, 4-methyl-*	7.2
	Decane, 2,6-dimethyl	5.2
	4-Undecene, 8-methyl-, (Z)-*	5.2
	Dodecane	4.8
	Heptane, 2,2,4,6,6-pentamethyl- (8CI9CI)*	4.4
	Decane, 4-methyl	4.2
	2,2,7,7-Tetramethyloctane*	3.8
	Nonane, 3-methyl-5-propyl-*	3.3
	Decane, 2,3,7-trimethyl- (9CI)*	2.3
	Decane, 3,3,5-trimethyl- (9CI)*	2.3
	Decane, 2,2,3-trimethyl	2.2
	Dodecane, 2,5-dimethyl-*	3.2
Tridecane	1.4	
Octane, 5-ethyl-2-methyl- (9CI)*	Tr	

Released by Air Quality Sciences, Inc.
Date Prepared: April 20, 1993
AQS Project #: 01453
AQS Report #: 01463-01

CATEGORY	COMPOUND IDENTIFIED	EMISSION FACTOR $\mu\text{g}/\text{m}^2\cdot\text{hr}$
Aromatics	Xylene, para	2.2
	Xylene, ortho	1.6
Esters	Acetic acid, phenylmethyl ester*	3.1
Halocarbons	None detected	
Ketones	None detected	
Turpenes	None detected	
Unidentified		23.5

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*indicates NBS best library match only.

Released by Air Quality Sciences, Inc.
 Date Prepared: April 20, 1993
 AQS Project #: 01453
 AQS Report #: 01453.01

ENVIRONMENTAL CHAMBER TEST REPORT

ELAPSED EXPOSURE HOUR	TVOC EMISSION FACTOR $\mu\text{g}/\text{m}^2\cdot\text{hr}$
4.000	89.23

Customer: Clayton Environmental

Sample Identification: AQS01453-002AA

Product Description: Screen; PH-10; Weathered

Environmental Chamber: SA4

Product Loading: $0.96 \text{ m}^2/\text{m}^3$

Test Conditions: 1.0 ACH
50.0% RH \pm 2.0% RH
23.0°C \pm 1.0°C

Test Period: 04/13/93 - 04/13/93

Standard Test Methodology for Determining Volatile Organic Compound Emission Factors from Consumer Materials under Defined Test Conditions Using Small Environmental Chambers.

Released by Air Quality Sciences, Inc.
Date Prepared: April 20, 1993
AQS Project #: 01453
AQS Report #: 01453-01

**IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS
AT 4 ELAPSED EXPOSURE HOURS**
μg/m³·hr

PRODUCT 01453-002AA, SCREEN, PH-10, WEATHERED

CATEGORY	COMPOUND IDENTIFIED	EMISSION FACTOR μg/m ³ ·hr
Acids	None detected	
Alcohols and Associated Compounds	1-Octanol, 2-butyl- (8CI9CI)*	6.8
	Cyclohexanol, 2-(1,1-dimethylethyl)*	5.8
	1-Hexanol, 2-ethyl	4.1
	Ethanol, 2-butoxy	3.7
	Ethanol, 2-ethoxy	2.9
	1-Dodecanol, 2-methyl-, (S)- (9CI)*	2.6
Aldehydes	Benzaldehyde	1.4
Aliphatics	Undecane, 6,6-dimethyl-*	11.6
	Undecane	6.7
	Undecane, 4,8-dimethyl*	4.5
	Decane, 4-methyl*	3.5
	Decane, 3,3,8-trimethyl- (9CI)*	3.5
	Decane, 2,2,6-trimethyl- (9CI)*	3.4
	Undecane, 4,6-dimethyl- (8CI)*	3.3
	Dodecane	2.6
	Decane, 2-methyl	1.5
Aromatics	Xylene, para	9.9
	Xylene, ortho	4.6
	Benzene, ethyl	2.0
	Toluene	1.4
Esters	None detected	

CATEGORY	COMPOUND IDENTIFIED	EMISSION FACTOR $\mu\text{g}/\text{m}^2\cdot\text{hr}$
Halocarbons	None detected	
Ketones	None detected	
Turpenes	None detected	
Unidentified		3.7

*Indicates NBS best library match only.

Released by Air Quality Sciences, Inc.
Date Prepared: April 20, 1993
AQS Project #: 01453
AQS Report #: 01453-01

930916CC 2588..



PHIFER WIRE PRODUCTS, INC.

P. O. BOX 1700 • TUSCALOOSA, ALABAMA 35403-1700 U.S.A.

■ CHARLES E. MORGAN
Executive Vice President and Corporate Counsel

June , 1992

*Received by neighbor
who first realized health
problems were related to
the screens!*

Mr. Tim Battersby
The Home Insurance Company
P. O. Box 168
Grand Rapids, MI 49501-1700

Re:
Claim Number 222

Dear Mr. Battersby:

I was surprised and disturbed to hear that contends that Phifer Wire was negligent in dealing with the odor problem associated with some of our fiberglass insect screening. I have reviewed our records and spoken with the founders and owners of this company as well as with plastisol engineers and key members of our sales department and, based on that research, will attempt to summarize the history of this problem.

Phifer Wire Products was founded in 1952 and has been the world's leading manufacturer of insect screening for at least the last ten years. We are extremely proud of our record of consistent quality over the past four decades. The cause of the odor coming from the silver-gray screening in the home was the accelerated deterioration of the product due to ultraviolet sun rays. Prior to 1988, that problem was unknown to this company and even today it is rare.

In January 1988 we changed our plastisol stabilizer in order to make the product environmentally safer. It had never been dangerous to consumers, but the change made disposal of scrap material safer. ¹⁹⁸⁸ Although we succeeded in making the product safer, we miscalculated in mixing the plastisol formula for silver-gray screening by not putting enough pigment into it. The result was the material would deteriorate rapidly when exposed to direct sunlight. The odor was associated with this process of rapid deterioration. By the following year, we had had several product failures, discovered their cause, and, in June 1989, improved the plastisol formula (without putting back any dangerous substances), thus ending this problem forever.



OAKLAND
COUNTY MICHIGAN
DEPARTMENT OF INSTITUTIONAL
AND HUMAN SERVICES

Daniel T. Murphy, Oakland County Executive
HEALTH DIVISION
Thomas J. Gordon, Ph.D., Manager

MEMORANDUM

July 22, 1992

TO: CAROL CHASE

FROM: NELSON HAYNES, R.S., SENIOR PUBLIC HEALTH SANITARIAN
OAKLAND COUNTY HEALTH DIVISION *N.H.*

SUBJECT: WINDOW SCREENS AT RESIDENCE LOCATED AT 6881 VAIL CT.,
CLARKSTON, MICHIGAN 48348

In March 1990 I conducted a complaint investigation at the above captioned address. Residents were concerned about a foul, acrid odor coming from rooms in direct sunlight. I did agree that their was a strong, irritating odor. Although I could not determine the exact cause I did feel that it was at minimum an extreme nuisance and corrective action should be taken as soon as possible as the residents health could be affected.

If this division can be of any further assistance, please call (3213) 858-1327.

Daniel T. Murphy-Oakland County Executive



Robert A. Long, R.S., M.P.H.
Administrative Assistant
Environmental Health Services
Health Division

Department of Institutional and Human Service
Health Division Bldg 858-1333
1200 N. Telegraph Rd., Pontiac, Michigan 48059

48311

Dr. Kamrin PHD
Institute for Environmental Toxicology
C-231 Holden Hall
Michigan State University
East Lansing, Mi. 48824

Sept. 9, 1992

Dear Dr. Kamrin,

Enclosed you will find all the information passed on to us by our neighbor, Carol Chase. The Hoff's and the Chase's were the families who initiated the contact with the producers of the screens, Phiper Wire Products and the distributor of the screens Weathervane.

As far as the background in these two complaints goes, as I understand it, the problem started for them about two years ago. When the weather became such that the windows needed to be closed an obnoxious strong odor became prevalent throughout the entire home. The Fire Department was called to the home of the Hoff's and determined that the odor was emitted from the screens, they advised the homeowners that the screens should be removed and the house aired-out. I believe that the Hoff's complaints were basically "Upper Respiratory Symptoms".

The Chase's complaint involved their small son's constant U.R.I.'s. Carol Chase who was pregnant at the time experienced frequent spontaneous vomiting. One of Carol's concerns is regarding her exposure during pregnancy and the possible side effects to her daughter that she carried during the exposure.

Carol became alarmed by the strong odor in her home and called the Oakland County Public Health Department. The Health Department determined the foul acidic odor from the rooms in direct sunlight was an extreme nuisance and may be a health danger. Since the odor seemed to smell electrical they had the electrical system in the home checked and found nothing. They later discovered that the odor was emitted from the screens and had them removed.

My family, the Golarz's, were effected by the debilitation of myself, Mary. For almost three (3) years every system in my body was effected. Admittedly, the condition of Chronic Fatigue Immune Deficiency Syndrome (CFIDS), is minor compared to the trauma of the deteriorated state the screen toxins apparently caused.

During our phone conversation, you mentioned consulting with a Doctor of Environmental Health on the staff of Michigan State University. If you need any additional information which would help in evaluating this situation, feel free to call us at 313-391-1675. My son Kurt is attending Michigan State as

a Sophomore and can be called if you can not get in touch with us. He could forward any questions to us. His number is 517-336-9419.

If you can find any connection between my debilitated state and the toxins in the screens it would be extremely helpful to me in dealing with my future. If there are other products that contain these toxins, that would be detrimental to me, it would sure be nice to know what to look for. All or most of my problems dealt with the nervous system, I had problems speaking, thinking, writing, walking, organizing just to name a few.

Thank you for your help.

YOURS TRULY

MARY S. GOLARZ

A handwritten signature in cursive script that reads "Mary S. Golarz". The signature is written in dark ink and is positioned below the typed name.



MR. & MRS. JOSEPH GOLARZ
 JOE & MARY
 6710 SUN VALLEY DRIVE
 CLARKSTON, MI 48348

Please keep in mind that the negative effects our family experianced for two and one half to three years are still present in other homes wherever the screens are still in place.

The "History" as we understand it to date is that Phifer Wire Products, Inc. had to change the process used to coat their screens because employees were becoming ill. Although the company was aware of this problem, to date, we have never been notified of the recall of screens made in 1989. Also, the window company, "Weathervane" who distributed the known toxic screens to homes in our neighborhood in 1989, never notified us of the problem when they placed the screens in our homes.

Other families in our subdivision were also effected. We also understand that the "odor" which the screens emitted has been a complaint from various other parts of the United States.

When I spoke to Doctor Meeks, who was in charge of the screen assessment (at the request of Phifer Wire Products) at the University of Alabama Department of Environmental Health Sciences, He admitted to me per phone that he didn't have knowledge of the total possible toxic effects of the gases released from the screens.

Upon our arrival in Michigan in November of 1988 until the summer of 1989, I was basically healthy. I did need extra rest. I was also in need of a hysterectomy due to prolonged periods with clots.

My time was spent enjoying the challange of relocation with my family members who were all in good health. I spent much of my time organizing the decorating, landscaping ect. of our home.

The screens were placed in our home on May 5, 1989.

By August I began coughing and noticed that in the mornings my eyes felt like they were burning.

Although I had been on Theodur 150 mg. bid. for about 11 years along with a Bronchometer p.r.n. (since I had E. Coli Pneumonia), I continued to cough.

For two weeks straight, day and night, I had a non-productive cough with no relief. I developed respiratory stridor with difficulty breathing and was treated in the Emergency Room of Troy Beaumont. The Hysterectomy had to be postponed for a month. I was placed on cortizone theroapy twice in a three month time frame.

All Family members were effected in different ways. The members effected were Joseph age 49, Kurt age 19, Susan age 19 and Keith age 8.

Sept 10, 1992 • Out of the 50 homes in our subdivision, I know of
note • 10 homes ^{of} which had the screens replaced.
 Weathervane Phone 313-227-4900